



## UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,323	04/09/2004	Yosuke Hosoya	09792909-5853	9692
26263	7590	02/21/2008	EXAMINER	
SONNIENSCHEIN NATH & ROSENTHAL LLP			ECHELMEYER, ALIX ELIZABETH	
P.O. BOX 061080			ART UNIT	PAPER NUMBER
WACKER DRIVE STATION, SEARS TOWER			1795	
CHICAGO, IL 60606-1080			MAIL DATE	DELIVERY MODE
			02/21/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/821,323	<b>Applicant(s)</b> HOSOYA ET AL.
	<b>Examiner</b> Alix Elizabeth Echelmeyer	<b>Art Unit</b> 1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(o).

#### Status

- 1) Responsive to communication(s) filed on 03 December 2007.  
 2a) This action is FINAL.      2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-5 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-5 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
     Paper No(s)/Mail Date 12/26/07.
- 4) Interview Summary (PTO-413)  
     Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_

**DETAILED ACTION**

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 3, 2007 has been entered.
2. Claims 1 and 5 have been amended. Claims 1-5 are pending and are rejected for the reasons given below.

***Claim Rejections - 35 USC § 112***

3. The rejections of claims 1 and 5 are withdrawn in light of the amendment.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
5. Claims 1, 2, 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oesten et al. (US 2001/0046628 A1) in view of Spitzer (US 2004/0197657).

Oesten et al. disclose a coated lithium nickel mixed oxide particle and the method of making the particle for use as the cathode material in an electrochemical cell.

The coated lithium mixed oxide particles are used to improve the properties of the electrochemical cell. The particle core is a lithium mixed oxide containing nickel ([0032]) such as  $\text{Li}_x\text{Ni}_y\text{Mn}_{2-y}\text{O}_4$ . The particle coating is a metal oxide or a mixture of alkali metal compounds and metal oxides ([0033], [0034]). The use of titanium oxide as the particle coating is disclosed ([0034]).

The lithium mixed oxide particles of the active material of Oesten et al. correspond to the first compound oxide of lithium and nickel in claims 1 and 5 of the instant application. The particle coating of, for example, titanium oxide as taught by Oesten et al. corresponds to the second compound oxide of lithium and titanium of the instant application. As in the instant application, the titanium oxide of Oesten et al. is coated on particles of the lithium mixed oxide containing nickel.

Regarding claim 2, Oesten et al. do not explicitly teach that the weight ratio of the first compound oxide to the second compound oxide is between 96:4 and 65:35. Oesten et al. do teach that the weight ratio of the coating metal oxide to the lithium mixed oxide particles is from 0.01 to 20 percent. The weight ratio of the alkali metal to the lithium mixed oxide particles in the cathode is from 0.01 to 10 percent. It would have been obvious to one having ordinary skill in the art at the time the invention was made to optimize the weight relationship between the core oxide material and the coating oxide material such as taught by Oesten et al. in order to provide a thick enough coating that inhibits the undesirable reactions of the acid with the electrode material. It has been held that where general conditions of a claim are disclosed in the prior art, discovering

Art Unit: 1795

the optimum or workable range involves only routine skill in the art. In re Aller, 105

USPQ 233. MPEP 2144.05 (IIB).

As for claims 1 and 5, Oesten et al. fail to teach that the titanium oxide particle coating is one of those listed in the amendment. Additionally, Oesten et al. fail to teach the limitation of claim 3 that the titanium oxide material has a spinel structure.

Spitler et al. teach the use of a lithium titanium spinel oxide ( $\text{Li}_4\text{Ti}_5\text{O}_{12}$ ) as the positive material for the cathode of a lithium ion battery ([0001]).

Spitler et al. further teach that the lithium titanate spinel oxide allows for an extremely high charge and discharge rates and a large number of charge and discharge cycles ([0022]).

It would be desirable to use the lithium titanium spinel oxide ( $\text{Li}_4\text{Ti}_5\text{O}_{12}$ ) of Spitler et al. as the lithium oxide of the coating of Oesten et al. since the lithium titanium spinel oxide ( $\text{Li}_4\text{Ti}_5\text{O}_{12}$ ) allows for extremely high charge and discharge rates and a large number of charge and discharge cycles.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the mixture of alkali metal compounds and metal oxides coating of Oesten et al. to include a spinel lithium titanate oxide as the titanium oxide material such as taught by Spitler et al. in order to enhance the charge and discharge rate of the electrochemical cell. Such a spinel compound is structurally stable in the electrolyte of the battery.

Art Unit: 1795

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oesten et al. in view of Spitzer et al. as applied to claim 1 above, and further in view of Naruoka et al. (US 6,893,766 B2).

The teachings of Oesten et al. and Spitzer et al. as discussed above are incorporated herein.

Oesten et al. and Spitzer et al. teach the coated positive electrode active material of the instantly claimed invention, but fail to teach that the material has a mean particle diameter of 5 to 20  $\mu\text{m}$ .

Naruoka et al. teach a positive active material for a secondary battery. The positive active material is lithium nickel composite oxide (col. 2 lines 45-56). The mean particle diameter of the lithium nickel composite oxide is 4 to 25  $\mu\text{m}$  (col. 3 lines 44-51).

Naruoka et al. teach that if the mean particle diameter of the positive electrode active material is smaller than 4  $\mu\text{m}$ , there may not be continuous contact with the electrically conductive material. Naruoka et al. also teach that if the mean particle diameter of the positive electrode active material is larger than 25  $\mu\text{m}$ , the electrolyte may not penetrate the electrode material. This would adversely affect the charge and discharge rates of the battery (col. 3 lines 51-59).

It would be desirable to use make the positive active material of Oesten et al. in view of Spitzer et al. having particles in the range of 4-25  $\mu\text{m}$ , within which 5-20  $\mu\text{m}$  falls, since particle sizes outside of that range adversely affect the charge and discharge rates of the battery, either by preventing continuous contact with the electrically conductive material or by not allowing the electrolyte to penetrate the electrode material.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the positive electrode active material of Oesten et al. in view of Spitzer et al. having a mean particle size in the range of 5 to 20  $\mu\text{m}$  as taught by Naruoka et al. in order to maintain electrical conductivity within the battery and improve charge and discharge rates in the battery.

***Response to Arguments***

7. Applicant's arguments filed October 22, 2007 have been fully considered but they are not persuasive.

Beginning on page 4, Applicant argues that there is no suggestion in Spitzer et al. to substitute  $\text{Li}_4\text{Ti}_5\text{O}_{12}$  for the coating of Oesten et al. because Spitzer et al. teach that there are various types of  $\text{Li}_4\text{Ti}_5\text{O}_{12}$ . While the examiner agrees that this teaching is found in Spitzer et al., the reference clearly teaches the use of a spinel  $\text{Li}_4\text{Ti}_5\text{O}_{12}$  because it allows for an extremely high charge and discharge rates and a large number of charge and discharge cycles ([0022]).

Next, Applicant argues that the process of forming the coating of the instant application is not taught in the combination, and that the process produces a different coating than the one of the combination. This is contradictory to the instant specification, which states that "the method for coating ... is not limited as long as adhesion can be achieved ..." (page 14). Since the substitution of the coating of Oesten et al. with the material of Spitzer et al. still produces a particle having a coating that is adhered, the rejection meets this limitation.

As for the argument asserting that Spitzer et al. teach the use of Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub> as the electrode material and not a coating on an electrode material, the examiner points out that Applicant is attacking the reference individually instead of the rejection as whole. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant asserts that the ratio of claim 2 is not taught in the prior art; however, a rejection of claim 2 is provided above.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is (571)272-1101. The examiner can normally be reached on Mon-Fri 8-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy N. Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1795

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Alix Elizabeth Echelmeyer  
Examiner  
Art Unit 1795

aee

/Susy N Tsang-Foster/

Supervisory Patent Examiner, Art Unit 1795